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Taxonomic paper

Millipedes and centipedes in German greenhouses (Myriapoda: Diplopoda, Chilopoda)

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Abstract

A review is given of all the literature records of millipedes and centipedes that have been found in German greenhouses together with additional records for 29 such sites. Species lists are given for 46 greenhouses investigated throughout Germany. Thirty-five diplopod and 18 chilopod species were found to occur in greenhouses, of which 15 (3 Chilopoda, 12 Diplopoda) are restricted to this type of habitat. First records for Germany include *Anadenobolus monilicornis* (Porat, 1876), Epinannolene cf. trinidadensis Chamberlin, 1918, *Epinannolene* sp., *Mesoiulus gridellii* Strasser, 1934, *Leptogoniulus sorornus* (Butler, 1876), *Rhinotus purpureus* (Pocock, 1894), *Cryptops doriae* Pocock, 1891, *Lamyctes coeculus* (Brölemann, 1889) and *Tygarrup javanicus* (Attems, 1907). The millipedes *Oxidus gracilis* (C. L. Koch, 1847) and *Amphitomeus attemsi* (Schubart, 1934) and the centipedes *Lithobius forficatus* (Linnaeus, 1758) and *Cryptops hortensis* (Donovan, 1810) are the species most frequently found in greenhouses.

Keywords

Millipedes, centipedes, hothouse, Germany, first records, review

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Introduction

Greenhouses provide different environmental conditions for animal colonization and survival compared with natural or synanthropic habitats outside. Greenhouses are characterized by a lack of frost and higher, usually constant temperatures, high humidity, permanent, regular watering, the presence of plants from mostly tropical countries and lack of or only low amounts of leaf litter and dead wood provide a more or less unique ecosystem inside such artificial buildings.

Examples of possible pathways of introduction of myriapods in the greenhouses can be found in Attems (1901) and Kraepelin (1901). Myriapods from all developmental stages (eggs, juveniles, adults) can be introduced easily within soil and other substrates associated with plants during shipment.

The apparent first record of a myriapod species from greenhouses in Germany is that by Schnur (1857), who recorded "*Scolopendra germanica* C. L. Koch, 1837". This species should be referred to either *Cryptops hortensis* (Donovan, 1810) or *C. parisi* Brölemann, 1920 (Attems 1930: 211). Which of these two species in fact was found by Schnur (1857) cannot be certain now today because the specimens have been lost. Another species recorded by Schnur (1857) is *Mecistocephalus maxillaris* (as *Geophilus maxillaris*). The identity of this species is doubtful and its specific status requires verification (Bonato and Minelli 2004). The same is true for the records by Latzel (1895) (*Mecistocephalus guildingii* Newport, 1844, later repeated as *M. maxillaris* by Jeekel (1964a)) and Eichler (1952).

Latzel (1895) recorded *Oxidus gracilis* (as *Paradesmus gracilis*), *M. maxillaris*, *Lithobius forficatus* and *Paraspirobolus lucifugus* (as *Spirobolus dictyonotus* Latzel, 1885) (Fig. 1) from a hothouse in a nursery in Hamburg and *Poratia digitata* (as *Scytonotus digitatus* Porat, 1899) from a tannery near Hamburg. The record of *P. lucifugus* was wrongly referred to the tannery in Bergedorf near Hamburg by Schubart (1934).

Figure 1.

Living individual of *Paraspirobolus lucifugus* in the Hamburg Botanical Garden.

Silvestri (1907) later described *Pectiniunguis pauperatus* Silvestri, 1907 from plant soil in the Hamburg Botanical Garden, but this species has never been found subsequently.

Reports of other species were published by Boettger (1929), Hahmann (1929a), Hahmann (1929b), Schubart (1925), Schubart (1929b), Schubart (1929a), Verhoeff (1891), Verhoeff (1907), Verhoeff (1934) and other authors. Most of these are summarized by Eichler (1952) together with his own observations in the Berlin-Dahlem Botanical Garden. In total this author listed 20 diplopod and nine chilopod species for Germany. In the following decades sparse records by Adis et al. (2000), Decker and Hannig (2011), Golovatch et al. (2001), Jeekel (1964a), Läffert (1984), Richter (1967), Schubart (1957), Thiele (1968), Wilck (2000) increased the number of species known from German greenhouses to a total of 23 diplopod and 12 chilopod species.

With regard to the other two myriapod groups, no Pauropoda are so far known from German greenhouses and for Symphyla the three species *Hanseniella oligomacrochaeta* Scheller, 2002, *Symphylella vulgaris* (Hansen, 1903) and *Hanseniella orientalis* (Hansen, 1903) were recorded from the greenhouses in the Berlin-Dahlem Botanical Garden (Scheller 2008). We did not carry out further investigationa for these two groups.

Records of millipedes and centipedes in greenhouses for most of other European countries are mostly scattered in the literature, e.g.: Austria (Golovatch and Sierwald 2001, Golovatch et al. 2001a, Golovatch et al. 2001, Gruber and Christian 2002, Gruber 2002), Belgium (Kime 2004), Denmark (Andersson et al. 2005, Blower and Rundle 1986, Enghoff 1975, Enghoff 1987), Czech Republic (Kocourek 2013), France (Brölemann 1896, Geoffroy and Iorio 2009, Gervais 1836, Golovatch and Sierwald 2001, Golovatch et al. 2001), Netherlands (Berg et al. 2008, Jeekel 1953), Poland (Jedryczkowski 1982, Jedryczkowski 1996), Slovakia (Mock 2001), Sweden (Andersson et al. 2005, Blower and Rundle 1986, Lohmander 1925, Porat 1889) and Switzerland (Bigler 1913, Holzapfel 1932, Pedroli-Christen 1993). Only the greenhouse fauna of Great Britain is quite well studied (e.g. Barber 1992, Barber 2005, Barber 2009, Blower 1985, Blower and Rundle 1980, Blower and Rundle 1986, Lee 2005a, Lee 2005b, Lee 2006, Lewis 2007, Pocock 1906, Read 2008) but lacks a comprehensive overview. A general overview of alien myriapods in Europe is provided by Stoev et al. (2010).

Currently, the increasing number of new constructions of tropical houses in Germany (Fig. 2) as pleasure grounds, butterfly houses or similar institutions has increased the number of exotic plants, mostly imported directly from tropical countries. The exchange of common plant stocks among botanical gardens has also supported the dispersal of alien myriapods.

Figure 2.

View from the top-of-the-tree-path in the greenhouse 'Gondwanaland', Zoological Garden Leipzig. Photograph: N. Lindner.

Materials and methods

In total, data for 46 greenhouses has been compiled (Table 1). Records from botanical gardens were not included if they had been made outside the greenhouses. Altogether we provide data for 53 species (35 Diplopoda and 18 Chilopoda) found in German greenhouses.

Table 1.

List of all investigated greenhouses in Germany.

City	Name of locality	Literature	(Re-)Investigated in this study
Bayreuth	Bayreuth Ecological Botanical Garden		×
Berlin	Berlin Old Botanical Garden	Eichler 1952	
	Berlin-Dahlem Botanical Garden	Boettger 1929, Eichler 1952, Golovatch et al. 2001, Schubart 1934, Schubart 1929a	×
	Berlin Zoological Garden		×
	(Cemetary) nurseries, without exact locality	Schubart 1929a, Schubart 1957	
	Horticulture company in Berlin-Zehlendorf	Boettger 1929	
Bochum	Bochum Botanical Garden		×
Bonn	Bonn Botanical Garden	Decker and Hannig 2011	×
	Hothouse of Mr. Biesing	Verhoeff 1891	

Darmstadt	Darmstadt Botanical Garden		×
Dresden	Dresden Botanical Garden	Richter 1967	×
Düsseldorf	Aquazoo-Löbbecke Museum	Adis et al. 2000	
Duisburg	Hothouse, without exact locality		×
Frankfurt am Main	Palm Garden	Heußler 2009	×
Gießen	Gießen Botanical Garden	Läffert 1984	
Halle	Halle Botanical Garden	Schubart 1934	×
Hamburg	Hamburg Botanical Garden	Jeekel 1964a, Silvestri 1907	×
	Hothouses in Hamburg-Wandsbeck	Hahmann 1929a, Hahmann 1929b	
	Nursery, without exact locality	Latzel 1895	
	Tannery, without exact locality	Latzel 1895	
	Greenhouse, without exact locality	Latzel 1895	
Hannover	Hothouse, without exact locality	Schubart 1934	
Jena	Jena Botanical Garden		×
Kamen	Hothouse, without exact locality	Verhoeff 1934	
Karlsruhe	Karlsruhe Botanical Garden		×
Kiel	Kiel Botanical Garden	Adis et al. 2000, Wilck 2000	
	Greenhouse, without exact locality		×
Köln/Cologne	Cologne Botanical Garden	Decker and Hannig 2011	×
	Zoological Institut at Weyertal	Thiele 1968	
Konstanz	Mainau, Butterfly house		×
Leipzig	Leipzig Botanical Garden		×
	Zoological Garden Leipzig, Gondwanaland		×
	Nursery garden and horticulture		×
Lübeck	Palm house	Schubart 1925	
Mainz	Mainz Botanical Garden		×
	City Park		×
Magdeburg	Gruson-Greenhouses		×
Marburg	Marburg Botanical Garden		×
Marlow	Ornithological Park Marlow		×
München/Munich	München-Nymphenburg Botanical Garden	Boettger 1929	×
Oldenburg	Oldenburg Botanical Garden		×
Potsdam	Potsdam Botanical Garden		×

	Terrace nursery Park Sanssouce	Schubart 1929b	×
	Biosphere Potsdam		×
	Horticulture company in Potsdam-Neubabelsberg	Schubart 1957	
Rostock	Rostock Botanical Garden	Schubart 1929a	
Tharandt	Tharandt Botanical Forest Garden		×
Trier	Greenhouse, without exact locality	Schnur 1857	

The present investigation is based on a comprehensive review of the literature and an analysis of the collections of the Senckenberg Museum of Natural History Görlitz (SMNG), the Museum of Natural History Berlin (ZMB), as well as of the data available in the Global Biodiversity Information Facility (GBIF, http://www.gbif.org, Edwards et al. 2000) and in the database on soil zoology, Edaphobase (http://www.edaphobase.org, Burkhardt et al. 2014).

In addition the myriapod faunas of 29 German greenhouses were investigated or reinvestigated by us (Table 1). For this part of our study Norman Lindner (Leipzig) provided highly valuable material from greenhouses in Berlin, Dresden, Konstanz, Leipzig and Potsdam. Altogether we collected more than 1800 specimens belonging to 41 species (29 Diplopoda, 12 Chilopoda). The sampling was done mainly by hand searching under stones or rotten plants and logs. Pitfall traps were used only in the Palm Garden in Frankfurt in 2008 by Heußler (2009), whose diploma thesis results are also included in the present study.

Material from these new samples has been mainly deposited in the Myriapoda collections of the Senckenberg Museum of Natural History Görlitz (SMNG). Record data is available online via the data portals of GBIF and Edaphobase. The full data sets with detailed information on site parameters, microhabitats and collection methods are available as Suppl. material 1. An overview of species and the cities is given in Suppl. material 2.

The natural distribution area is given for each species.

Nomenclature and classification follows Voigtländer et al. (2011).

Checklist of centipedes and millipedes in German greenhouses

Class Chilopoda Latreille, 1817

Order Lithobiomorpha Pocock, 1895

Family Henicopidae Pocock, 1901

Lamyctes coeculus (Brölemann, 1889)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: March - April 2013; recordedBy: N. Lindner; disposition: SMNG

b. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; recordedBy: N. Lindner; disposition: SMNG

Distribution: Southern hemisphere

Family Lithobiidae Newport, 1844

Lithobius aeruginosus L. Koch, 1862

Material

a. country: Germany; locality: Kamen; verbatimLocality: hothouse near Kamen; decimalLatitude: 51.5900; decimalLongitude: 7.6600; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 5800; eventDate: 15 April 1905; individualCount: 1; source: Verhoeff 1934

Distribution: Europe

Lithobius crassipes L. Koch, 1862

Materials

a. country: Germany; locality: Darmstadt; verbatimLocality: Darmstadt Botanical Garden; decimalLatitude: 49.8700; decimalLongitude: 8.6798; geodeticDatum: WGS84; eventDate: 20 January 2007; individualCount: 1; recordedBy: P. Decker & N. Laufer; disposition: SMNG

b. country: Germany; locality: Mainz; verbatimLocality: Mainz Botanical Garden; decimalLatitude: 49.9925; decimalLongitude: 8.2454; geodeticDatum: WGS84; eventDate: 04 November 2006; individualCount: 1; recordedBy: P. Decker; disposition: SMNG

Distribution: Europe

Lithobius forficatus (Linnaeus, 1758)

Materials

a. country: Germany; locality: Bayreuth; verbatimLocality: Bayreuth Ecological Botanical Garden; decimalLatitude: 50.9810; decimalLongitude: 13.5730; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 500; eventDate: January - February 2012; individualCount: 3; recordedBy: J. Neubauer & K. Lebermann; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; source: Boettger 1929

c. country: Germany; locality: Berlin; verbatimLocality: greenhouses of horticulture company Bermann Rothe; decimalLatitude: 52.4320; decimalLongitude: 13.2580; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 3000; source: Boettger 1929

d. country: Germany; locality: Darmstadt; verbatimLocality: Darmstadt Botanical Garden; decimalLatitude: 49.8700; decimalLongitude: 8.6798; geodeticDatum: WGS84; eventDate: 20 January 2007; individualCount: 1; recordedBy: P. Decker & N. Laufer; disposition: SMNG

e. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 10 March 2013; individualCount: 1; recordedBy: N. Lindner; disposition: SMNG

f. country: Germany; locality: Hamburg; verbatimLocality: greenhouses; decimalLatitude: 53.5500; decimalLongitude: 9.9900; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 10000; source: Latzel 1895

g. country: Germany; locality: Leipzig; verbatimLocality: nursery garden and horticulture Felgenträger; decimalLatitude: 51.3690; decimalLongitude: 12.4400; geodeticDatum: WGS84; eventDate: 09 November 2008; recordedBy: N. Lindner; disposition: SMNG

h. country: Germany; locality: Magdeburg; verbatimLocality: Gruson-Greenhouses; decimalLatitude: 52.1139; decimalLongitude: 11.6315; geodeticDatum: WGS84; eventDate: 13 June 2012; individualCount: 6; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Lithobius lapidicola Meinert, 1872

Material

a. country: Germany; locality: Berlin; verbatimLocality: Berlin Old Botanical Garden; decimalLatitude: 52.4565; decimalLongitude: 13.3074; geodeticDatum: WGS84; source: Eichler 1952

Distribution: Europe

Lithobius melanops Newport, 1845

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin Zoological Garden; decimalLatitude: 52.5102; decimalLongitude: 13.3366; geodeticDatum: WGS84; eventDate: 28 September 2013; individualCount: 3; recordedBy: P. Decker & M. Köhler; disposition: SMNG

b. country: Germany; locality: Kamen; verbatimLocality: hothouse near Kamen; decimalLatitude: 51.5900; decimalLongitude: 7.6600; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 5800; eventDate: 15 April 1905; individualCount: 1; source: Verhoeff 1934

c. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: December 1998; recordedBy: N. Lindner; disposition: SMNG

d. country: Germany; locality: Leipzig; verbatimLocality: nursery garden and horticulture Felgenträger; decimalLatitude: 51.3690; decimalLongitude: 12.4400; geodeticDatum: WGS84; eventDate: 09 November 2008; individualCount: 2; recordedBy: N. Lindner; disposition: SMNG

Distribution: Europe

Lithobius microps Meinert, 1868

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; recordedBy: N. Lindner; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: greenhouses of horticulture company Bermann Rothe; decimalLatitude: 52.4320; decimalLongitude: 13.2580; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 3000; eventDate: 15 June 1949; individualCount: 1; source: Boettger 1929

Distribution: Europe

Lithobius mutabilis L. Koch, 1862

Material

a. country: Germany; locality: Magdeburg; verbatimLocality: Gruson-Greenhouses; decimalLatitude: 52.1139; decimalLongitude: 11.6315; geodeticDatum: WGS84; eventDate: 13 June 2012; individualCount: 3; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Order Scolopendromorpha Pocock, 1895

Family Cryptoptidae Kohlrausch, 1881

Cryptops hortensis (Donovan, 1810)

Materials

a. country: Germany; locality: Konstanz; verbatimLocality: Mainau, butterfly house; decimalLatitude: 47.7068; decimalLongitude: 9.1951; geodeticDatum: WGS84; eventDate: 21 April 2012; individualCount: 2; recordedBy: N. Lindner; disposition: SMNG

b. country: Germany; locality: Magdeburg; verbatimLocality: Gruson-Greenhouses; decimalLatitude: 52.1139; decimalLongitude: 11.6315; geodeticDatum: WGS84; eventDate: 13 June 2012; individualCount: 2; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Cryptops doriae Pocock, 1891

Material

a. country: Germany; locality: Potsdam; verbatimLocality: Biosphere Potsdam; decimalLatitude: 52.4185; decimalLongitude: 13.0486; geodeticDatum: WGS84; eventDate: 19 August 2013; individualCount: 3; recordedBy: N. Lindner; disposition: SMNG

Distribution: Asia

Order Geophilomorpha Pocock, 1895

Family Dignathodontidae Cook, 1896

Henia vesuviana (Newport, 1845)

Materials

a. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 10 March 2013; individualCount: 2; recordedBy: N. Lindner; disposition: SMNG

b. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: December 1996; individualCount: 1; recordedBy: N. Lindner; disposition: SMNG

Distribution: Europe

Family Geophilidae Leach, 1815

Geophilus flavus (De Geer, 1778)

Materials

a. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84; eventDate: 15 June 1949; individualCount: 1; source: Jeekel 1964

b. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: December 1999; individualCount: 2; recordedBy: N. Lindner; disposition: SMNG

Distribution: Europe

Geophilus electricus (Linnaeus, 1758)

Material

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; source: Eichler 1952

Distribution: Europe

Pachymerium ferrugineum (C.L.Koch, 1835)

Material

a. country: Germany; locality: Magdeburg; verbatimLocality: Gruson-Greenhouses; decimalLatitude: 52.1139; decimalLongitude: 11.6315; geodeticDatum: WGS84; eventDate: 13 June 2012; individualCount: 4; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Family Himantariidae Bollman, 1893

Haplophilus subterraneus (Shaw, 1794)

Material

a. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84; eventDate: 30 December 1950; individualCount: 1; source: Jeekel 1964

Distribution: Europe

Family Mecistocephalidae Bollman, 1893

Mecistocephalus maxillaris (Gervais, 1837)

Material

a. country: Germany; locality: Trier; verbatimLocality: surroundings of Trier; decimalLatitude: 49.7530; decimalLongitude: 6.6400; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 5000; source: Schnur 1857

Distribution: Asia

Tygarrup javanicus (Attems, 1907)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 6; recordedBy: N. Lindner; disposition: SMNG

b. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 10 March 2013; individualCount: 2; recordedBy: N. Lindner; disposition: SMNG

c. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: December 1995; individualCount: 2; recordedBy: N. Lindner; disposition: SMNG

d. country: Germany; locality: Leipzig; verbatimLocality: Zoological Garden Leipzig, Gondwanaland; decimalLatitude: 51.3505; decimalLongitude: 12.3716; geodeticDatum: WGS84; eventDate: March - April 2013; individualCount: 1; recordedBy: N. Lindner; disposition: SMNG

e. country: Germany; locality: Potsdam; verbatimLocality: Biosphere Potsdam; decimalLatitude: 52.4185; decimalLongitude: 13.0486; geodeticDatum: WGS84; eventDate: 19 August 2013; individualCount: 1; recordedBy: N. Lindner; disposition: SMNG

Distribution: Asia

Family Schendylidae Cook, 1896

Pectiniunguis pauperatus Silvestri, 1907

Material

a. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84; individualCount: 1; source: Silvestri 1907

Distribution: Asia

Class Diplopoda de Blainville in Gervais, 1844

Order Julida Brandt, 1833

Family Blaniulidae C. L. Koch, 1847

Archiboreoiulus pallidus (Brade-Birks, 1920)

Material

a. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 30 June 2010; individualCount: 8; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Blaniulus guttulatus (Bosc, 1792)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Eichler; disposition: ZMB; source: Eichler 1952

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 5; recordedBy: N. Lindner; disposition: SMNG

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 5; recordedBy: E. N. Lindner; disposition: SMNG

d. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 07 January 2012; individualCount: 1; recordedBy: P. Decker & S. Worch; disposition: SMNG

e. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 10 March 2013; individualCount: 4; recordedBy: N. Lindner; disposition: SMNG

f. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 10 March 2013; individualCount: 4; recordedBy: E. N. Lindner; disposition: SMNG

g. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 14-28 August 2008; individualCount: 131; recordedBy: E. Heußler; disposition: SMNG

h. country: Germany; locality: Jena; verbatimLocality: Jena Botanical Garden; decimalLatitude: 50.9308; decimalLongitude: 11.5858; geodeticDatum: WGS84; eventDate: 15 March 2004, 11 April 2008; individualCount: 5; recordedBy: H. Reip; disposition: SMNG

i. country: Germany; locality: Köln [Cologne]; verbatimLocality: Zoological Institut at Weyertal; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; source: Thiele 1968

j. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 2; recordedBy: H. Reip; disposition: SMNG

k. country: Germany; locality: Rostock; verbatimLocality: Rostock Botanical Garden; decimalLatitude: 54.0915; decimalLongitude: 12.0949; geodeticDatum: WGS84; eventDate: 04 March 1926; individualCount: 1; source: Schubart 1929b

Distribution: Europe

Boreoiulus tenuis (Bigler, 1913)

Material

a. country: Germany; locality: Jena; verbatimLocality: Jena Botanical Garden; decimalLatitude: 50.9308; decimalLongitude: 11.5858; geodeticDatum: WGS84; eventDate: 11 April 2008; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Choneiulus palmatus (Němec, 1895)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; disposition: ZMB; source: Schubart 1929a, Eichler 1952

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 19 March 2004, 29 April 2005; individualCount: 12; recordedBy: H. Reip; disposition: SMNG

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 9; recordedBy: N. Lindner; disposition: SMNG

d. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 9; recordedBy: E. N. Lindner; disposition: SMNG

e. country: Germany; locality: Bochum; verbatimLocality: Bochum Botanical Garden; decimalLatitude: 51.4433; decimalLongitude: 7.2669; geodeticDatum: WGS84; eventDate: November 2005; recordedBy: C. Schmidt

f. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 17 November 1964; source: Richter 1967

g. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 07 January 2012; individualCount: 1; recordedBy: P. Decker & S. Worch; disposition: SMNG

h. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: March-July 2008; individualCount: 19; recordedBy: E. Heußler; disposition: SMNG

i. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 28 November 2011; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

j. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84; eventDate: 10 November 2007; individualCount: 40; recordedBy: H. Reip; disposition: SMNG

k. country: Germany; locality: Jena; verbatimLocality: Jena Botanical Garden; decimalLatitude: 50.9308; decimalLongitude: 11.5858; geodeticDatum: WGS84; eventDate: 15 March 2004, 19 March 2004; individualCount: 23; recordedBy: H. Reip; disposition: SMNG

l. country: Germany; locality: Karlsruhe; verbatimLocality: Karlsruhe Botanical Garden; decimalLatitude: 49.0136; decimalLongitude: 8.4011; geodeticDatum: WGS84; eventDate: 13 April 2010; individualCount: 8; recordedBy: H. Reip; disposition: SMNG

m. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 30 June 2010; individualCount: 2; recordedBy: H. Reip; disposition: SMNG

n. country: Germany; locality: Köln [Cologne]; verbatimLocality: Zoological Institut at Weyertal; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; source: Thiele 1968

o. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: December 1999; individualCount: 2; recordedBy: N. Lindner; disposition: SMNG

p. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: 12 December 1995; individualCount: 2; recordedBy: E. N. Lindner; disposition: SMNG

q. country: Germany; locality: Magdeburg; verbatimLocality: Gruson-Greenhouses; decimalLatitude: 52.1139; decimalLongitude: 11.6315; geodeticDatum: WGS84; eventDate: 13 June 2012; individualCount: 33; recordedBy: H. Reip; disposition: SMNG

r. country: Germany; locality: Mainz; verbatimLocality: Mainz Botanical Garden; decimalLatitude: 49.9925; decimalLongitude: 8.2454; geodeticDatum: WGS84; eventDate: 04 November 2006; individualCount: 1; recordedBy: P. Decker; disposition: SMNG

s. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 25; recordedBy: H. Reip; disposition: SMNG

t. country: Germany; locality: Rostock; verbatimLocality: Rostock Botanical Garden; decimalLatitude: 54.0915; decimalLongitude: 12.0949; geodeticDatum: WGS84; eventDate: 04 March 1926; individualCount: 1; source: Schubart 1929b

Distribution: Europe

Nopoiulus kochii (Gervais, 1847)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin Zoological Garden; decimalLatitude: 52.5102; decimalLongitude: 13.3366; geodeticDatum: WGS84; eventDate: 28 September 2013; individualCount: 1; recordedBy: P. Decker & M. Köhler; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Eichler; disposition: ZMB; source: Schubart 1929a, Eichler 1952

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 1; recordedBy: N. Lindner; disposition: SMNG

d. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 1; recordedBy: E. N. Lindner; disposition: SMNG

e. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; individualCount: 14; recordedBy: E. Heußler; disposition: SMNG

f. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 28 November 2011; individualCount: 4; recordedBy: H. Reip; disposition: SMNG

g. country: Germany; locality: Kamen; verbatimLocality: hothouse near Kamen; decimalLatitude: 51.5900; decimalLongitude: 7.6600; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 5800; eventDate: 15 April 1905; source: Verhoeff 1934

h. country: Germany; locality: Kiel; verbatimLocality: Kiel Botanical Garden; decimalLatitude: 54.3470; decimalLongitude: 10.1158; geodeticDatum: WGS84; eventDate: 07 November 1998–11 September 1999; recordedBy: Wilck, Adis & Golovatch; source: Wilck 2000

i. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 26; recordedBy: H. Reip; disposition: SMNG

j. country: Germany; locality: Potsdam; verbatimLocality: terrace nursery Park Sanssouci; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; disposition: ZMB; source: Schubart 1929a

Distribution: Europe

Proteroiulus fuscus (Am Stein, 1857)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Boettger; source: Boettger 1929

b. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84;

eventDate: 07 November 2009; individualCount: 3; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Family Julidae Leach, 1814

Brachyiulus pusillus (Bosc, 1792)

Material

a. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 28 March 2008-11 April 2008; individualCount: 1; recordedBy: E. Heußler; disposition: SMNG

Distribution: Europe

Cylindroiulus britannicus (Verhoeff, 1891)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Boettger; source: Boettger 1929

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Eichler; disposition: ZMB; source: Schubart 1929a, Eichler 1952

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 5; recordedBy: N. Lindner; disposition: SMNG

d. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 5; recordedBy: E. N. Lindner; disposition: SMNG

e. country: Germany; locality: Berlin; verbatimLocality: horticulture company Bermann Rothe (Beyroth) in Berlin-Zehlendorf; decimalLatitude: 52.4320; decimalLongitude: 13.2580; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 3000; recordedBy: Boettger; source: Boettger 1929

f. country: Germany; locality: Bonn; verbatimLocality: Bonn Botanical Garden; decimalLatitude: 50.7243; decimalLongitude: 7.0913; geodeticDatum: WGS84; eventDate: 14 August 2007; individualCount: 7; recordedBy: P. Decker & N. Laufer; disposition: SMNG

g. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 17 November 1964; source: Richter 1967

h. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 07 January 2012; recordedBy: P. Decker & S. Worch; disposition: SMNG

i. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84;

eventDate: 10 November 2007; individualCount: 6; recordedBy: H. Reip; disposition: SMNG

j. country: Germany; locality: Kamen; verbatimLocality: hothouse near Kamen; decimalLatitude: 51.5900; decimalLongitude: 7.6600; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 5800; eventDate: 15 April 1905; individualCount: 45; source: Verhoeff 1934

k. country: Germany; locality: Lübeck; verbatimLocality: palm house; decimalLatitude: 53.8670; decimalLongitude: 10.6870; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 5000; source: Schubart 1925

l. country: Germany; locality: Potsdam; verbatimLocality: terrace nursery Park Sanssouci; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; source: Schubart 1929a

Distribution: Europe

Cylindroiulus caeruleocinctus (Wood, 1864)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 29 April 2005; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Boettger; source: Boettger 1929, Eichler 1952

c. country: Germany; locality: Berlin; verbatimLocality: horticulture company Bermann Rothe (Beyroth) in Berlin-Zehlendorf; decimalLatitude: 52.4320; decimalLongitude: 13.2580; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 3000; recordedBy: Boettger; source: Boettger 1929, Eichler 1952

d. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 11 April 2008-25 April 2008; individualCount: 11; recordedBy: E. Heußler; disposition: SMNG

e. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 08 November 2008; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Cylindroiulus latestriatus (Curtis, 1845)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; individualCount: 2; recordedBy: Eichler; disposition: ZMB; source: Eichler 1952

b. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: March 2008-May 2008; individualCount: 3; recordedBy: E. Heußler; disposition: SMNG

c. country: Germany; locality: Kiel; verbatimLocality: hothouse; decimalLatitude: 54.3200; decimalLongitude: 10.1400; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 10000; eventDate: 08 November 2008; individualCount: 2

d. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 26; recordedBy: H. Reip; disposition: SMNG

e. country: Germany; locality: Oldenburg; verbatimLocality: Oldenburg Botanical Garden; decimalLatitude: 53.1486; decimalLongitude: 8.1942; geodeticDatum: WGS84; eventDate: 29 November 2013; individualCount: 6; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Cylindroiulus punctatus (Leach, 1815)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin Zoological Garden; decimalLatitude: 52.5102; decimalLongitude: 13.3366; geodeticDatum: WGS84; eventDate: 28 September 2013; individualCount: 1; recordedBy: P. Decker & M. Köhler; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: Berlin Old Botanical Garden; decimalLatitude: 52.4565; decimalLongitude: 13.3074; geodeticDatum: WGS84; source: Eichler 1952

Distribution: Europe

Cylindroiulus truncorum (Silvestri, 1896)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin Zoological Garden; decimalLatitude: 52.5102; decimalLongitude: 13.3366; geodeticDatum: WGS84; eventDate: 28 September 2013; individualCount: 1; recordedBy: P. Decker & M. Köhler; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 19 March 2004, 29 April 2005; individualCount: 39; recordedBy: H. Reip; disposition: SMNG

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; individualCount: >3; disposition: ZMB; source: Schubart 1929a, Boettger 1929, Eichler 1952

d. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 10; recordedBy: E. N. Lindner; disposition: SMNG

e. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84;

eventDate: 07 January 2012; individualCount: 8; recordedBy: P. Decker & S. Worch; disposition: SMNG

f. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 10 March 2013; individualCount: 2; recordedBy: E. N. Lindner; disposition: SMNG

g. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 14 March 2008-17 July 2008; individualCount: 17; recordedBy: E. Heußler; disposition: SMNG

h. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 08 November 2008, 28 November 2011; individualCount: 23; recordedBy: H. Reip; disposition: SMNG

i. country: Germany; locality: Jena; verbatimLocality: Jena Botanical Garden; decimalLatitude: 50.9308; decimalLongitude: 11.5858; geodeticDatum: WGS84; eventDate: 11 April 2008; individualCount: 11; recordedBy: H. Reip; disposition: SMNG

j. country: Germany; locality: Kamen; verbatimLocality: hothouse near Kamen; decimalLatitude: 51.5900; decimalLongitude: 7.6600; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 5800; eventDate: 15 April 1905; individualCount: 4; source: Verhoeff 1934

k. country: Germany; locality: Karlsruhe; verbatimLocality: Karlsruhe Botanical Garden; decimalLatitude: 49.0136; decimalLongitude: 8.4011; geodeticDatum: WGS84; eventDate: 13 April 2010; individualCount: 57; recordedBy: H. Reip; disposition: SMNG

l. country: Germany; locality: Kiel; verbatimLocality: Kiel Botanical Garden; decimalLatitude: 54.3470; decimalLongitude: 10.1158; geodeticDatum: WGS84; eventDate: 07 November 1998–11 September 1999; recordedBy: Wilck, Adis & Golovatch

m. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 14 August 2007; individualCount: 3; recordedBy: P. Decker & N. Laufer; disposition: SMNG

n. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 30 June 2010; individualCount: 13; recordedBy: H. Reip; disposition: SMNG

o. country: Germany; locality: Leipzig; verbatimLocality: nursery garden and horticulture Felgenträger; decimalLatitude: 51.3690; decimalLongitude: 12.4400; geodeticDatum: WGS84; eventDate: 09 November 2008; individualCount: 13; recordedBy: N. Lindner; disposition: SMNG

p. country: Germany; locality: Leipzig; verbatimLocality: Zoological Garden Leipzig, Gondwanaland; decimalLatitude: 51.3505; decimalLongitude: 12.3716; geodeticDatum: WGS84; eventDate: 26 March 2013; individualCount: 1; recordedBy: E. N. Lindner; disposition: SMNG

q. country: Germany; locality: Magdeburg; verbatimLocality: Gruson-Greenhouses; decimalLatitude: 52.1139; decimalLongitude: 11.6315; geodeticDatum: WGS84; eventDate: 13 June 2012; individualCount: 30; recordedBy: H. Reip; disposition: SMNG

r. country: Germany; locality: Mainz; verbatimLocality: Mainz Botanical Garden; decimalLatitude: 49.9925; decimalLongitude: 8.2454; geodeticDatum: WGS84; eventDate: 04 November 2006; individualCount: 3; recordedBy: P. Decker; disposition: SMNG

s. country: Germany; locality: München [Munich]; verbatimLocality: München-Nymphenburg Botanical Garden; decimalLatitude: 48.1606; decimalLongitude: 11.5021; geodeticDatum: WGS84; eventDate: 28 May 2009; recordedBy: H. Reip; disposition: SMNG

t. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 40; recordedBy: H. Reip; disposition: SMNG

Distribution: North Africa

Cylindroiulus vulnerarius (Berlese, 1888)

Materials

a. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

b. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 2; recordedBy: H. Reip; disposition: SMNG

Distribution: Europe

Kryphioiulus occultus (C. L. Koch, 1847)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; individualCount: 2; recordedBy: Eichler; disposition: ZMB; source: Eichler 1952

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 1; recordedBy: E. N. Lindner; disposition: SMNG

Distribution: Europe

Mesoiulus gridellii Strasser, 1934

Material

a. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 11 April 2008-25 April 2008; individualCount: 1; recordedBy: E. Heußler; disposition: SMNG

Distribution: Europe

Ommatoiulus sabulosus (Linnaeus, 1758)

Material

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; source: Eichler 1952

Distribution: Europe

Unciger foetidus (C. L. Koch, 1838)

Material

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; source: Eichler 1952

Distribution: Europe

Order Spirobolida Cook, 1895

Family Rhinocricidae Brölemann, 1913

Anadenobolus monilicornis (Porat, 1876)

Material

a. country: Germany; locality: Leipzig; verbatimLocality: Zoological Garden Leipzig, Gondwanaland; decimalLatitude: 51.3505; decimalLongitude: 12.3716; geodeticDatum: WGS84; eventDate: 26 March 2013, 05 April 2013, 28 July 2013; individualCount: 6; recordedBy: E. N. Lindner; disposition: SMNG

Distribution: Central America, South America

Family Spirobolellidae Bollman, 1893

Paraspirobolus lucifugus (Gervais, 1836)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; individualCount: 1; disposition: ZMB; source: Schubart 1929a, Schubart 1934

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; individualCount: 6; recordedBy: Eichler; disposition: ZMB; source: Eichler 1952

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84;

eventDate: 15 May 2013; individualCount: 21; recordedBy: E. N. Lindner; disposition: SMNG

d. country: Germany; locality: Bonn; verbatimLocality: Bonn Botanical Garden; decimalLatitude: 50.7243; decimalLongitude: 7.0913; geodeticDatum: WGS84; eventDate: 14 August 2007; individualCount: 5; recordedBy: P. Decker & N. Laufer; disposition: SMNG; source: Decker & Hannig 2011

e. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 28 November 2011; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

f. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84; eventDate: 10 November 2007; recordedBy: H. Reip; disposition: SMNG

g. country: Germany; locality: Hamburg; verbatimLocality: tannery; decimalLatitude: 53.4870; decimalLongitude: 10.2150; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 4000; source: Latzel 1895

h. country: Germany; locality: Leipzig; verbatimLocality: Zoological Garden Leipzig, Gondwanaland; decimalLatitude: 51.3505; decimalLongitude: 12.3716; geodeticDatum: WGS84; eventDate: 26 March 2013, 05 April 2013; individualCount: 3; recordedBy: E. N. Lindner; disposition: SMNG

Distribution: South America

Family Trigoniulidae Attems, 1909

Leptogoniulus sorornus (Butler, 1876)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin Zoological Garden; decimalLatitude: 52.5102; decimalLongitude: 13.3366; geodeticDatum: WGS84; eventDate: 28 September 2013; individualCount: 1; recordedBy: P. Decker & M. Köhler; disposition: SMNG

b. country: Germany; locality: Leipzig; verbatimLocality: Zoological Garden Leipzig, Gondwanaland; decimalLatitude: 51.3505; decimalLongitude: 12.3716; geodeticDatum: WGS84; eventDate: 26 March 2013, 05 April 2013, 28 July 2013; individualCount: 33; recordedBy: E. N. Lindner; disposition: SMNG

Distribution: Southeast Asia

Order Spirostreptida Brandt, 1833

Family Epinannolenidae Silvestri, 1895

Epinannolene cf. trinidadensis Chamberlin, 1918

Material

a. country: Germany; locality: Leipzig; verbatimLocality: Zoological Garden Leipzig, Gondwanaland; decimalLatitude: 51.3505; decimalLongitude: 12.3716; geodeticDatum: WGS84; eventDate: 26 March 2013, 05 April 2013; individualCount: 16; recordedBy: E. N. Lindner; disposition: SMNG

Distribution: South America

Genus *Epinannolene* sp.

Materials

a. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 28 March 2008-24 October 2008; individualCount: 12; recordedBy: E. Heußler; disposition: SMNG

b. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 08 November 2008, 28 November 2011; individualCount: 23; recordedBy: H. Reip; disposition: SMNG

Distribution: South America

Order Polyzoniida Cook, 1895

Family Siphonotidae Cook, 1895

Rhinotus purpureus (Pocock, 1894)

Materials

a. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 14 March 2008-20 August 2008; individualCount: 35; recordedBy: E. Heußler; disposition: SMNG

b. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 28 November 2011; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

Distribution: South America

Order Polydesmida Pocock, 1887

Family Haplodesmidae Cook, 1895

Cylindrodesmus hirsutus Pocock, 1889

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin Zoological Garden; decimalLatitude: 52.5102; decimalLongitude: 13.3366; geodeticDatum: WGS84; eventDate: 28 September 2013; recordedBy: P. Decker & M. Köhler; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 29 April 2005; individualCount: 4; recordedBy: H. Reip; disposition: SMNG

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: May 2000, August 2000; recordedBy: M. Zerm

d. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 34; recordedBy: E. N. Lindner; disposition: SMNG

e. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; individualCount: 2; recordedBy: E. Heußler; disposition: SMNG

f. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 28 November 2011; individualCount: 16; recordedBy: H. Reip; disposition: SMNG

g. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84; eventDate: 10 November 2007; individualCount: 6; recordedBy: H. Reip; disposition: SMNG

h. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 14 August 2007; individualCount: 2; recordedBy: P. Decker & N. Laufer; disposition: SMNG

i. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 30 June 2010; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

j. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: 03 April 2013; individualCount: 11; recordedBy: E. N. Lindner; disposition: SMNG

k. country: Germany; locality: Leipzig; verbatimLocality: Zoological Garden Leipzig, Gondwanaland; decimalLatitude: 51.3505; decimalLongitude: 12.3716; geodeticDatum: WGS84; eventDate: 26 March 2013, 05 April 2013; individualCount: 31; recordedBy: E. N. Lindner; disposition: SMNG

l. country: Germany; locality: Mainz; verbatimLocality: Mainz Botanical Garden; decimalLatitude: 49.9925; decimalLongitude: 8.2454; geodeticDatum: WGS84;

eventDate: 04 November 2006; individualCount: 10; recordedBy: P. Decker; disposition: SMNG

m. country: Germany; locality: Potsdam; verbatimLocality: Biosphere Potsdam; decimalLatitude: 52.4185; decimalLongitude: 13.0486; geodeticDatum: WGS84; eventDate: 19 September 2013; individualCount: 5; recordedBy: E. N. Lindner; disposition: SMNG

n. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 24; recordedBy: H. Reip; disposition: SMNG

o. country: Germany; locality: Oldenburg; verbatimLocality: Oldenburg Botanical Garden; decimalLatitude: 53.1486; decimalLongitude: 8.1942; geodeticDatum: WGS84; eventDate: 29 November 2013; individualCount: 4; recordedBy: H. Reip; disposition: SMNG

Distribution: Asia

Prosopodesmus jacobsoni Silvestri, 1910

Materials

a. country: Germany; locality: Bonn; verbatimLocality: Bonn Botanical Garden; decimalLatitude: 50.7243; decimalLongitude: 7.0913; geodeticDatum: WGS84; eventDate: 14 August 2007; individualCount: 8; recordedBy: P. Decker & N. Laufer; disposition: SMNG; source: Decker & Hannig 2011

b. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 14 March 2008-24 October 2008; individualCount: 51; recordedBy: E. Heußler; disposition: SMNG; source: Decker & Hannig 2011

c. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 28 November 2011; individualCount: 2; recordedBy: H. Reip; disposition: SMNG; source: Decker & Hannig 2011

d. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 14 August 2007; individualCount: 2; recordedBy: P. Decker & N. Laufer; disposition: SMNG; source: Decker & Hannig 2011

e. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 30 June 2010; individualCount: 11; recordedBy: H. Reip; disposition: SMNG; source: Decker & Hannig 2011

Distribution: Indo-Australian region?

Family Oniscodesmidae DeSaussure, 1860

Amphitomeus attemsi (Schubart, 1934)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 29 April 2005; individualCount: 5; recordedBy: H. Reip; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Eichler; disposition: ZMB; source: Eichler 1952, Schubart 1934

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 12; recordedBy: E. N. Lindner; disposition: SMNG

d. country: Germany; locality: Bochum; verbatimLocality: Bochum Botanical Garden; decimalLatitude: 51.4433; decimalLongitude: 7.2669; geodeticDatum: WGS84; eventDate: 25 June 1905; individualCount: 4

e. country: Germany; locality: Bonn; verbatimLocality: Bonn Botanical Garden; decimalLatitude: 50.7243; decimalLongitude: 7.0913; geodeticDatum: WGS84; eventDate: 14 August 2007; individualCount: 1; recordedBy: P. Decker & N. Laufer; disposition: SMNG; source: Decker & Hannig 2011

f. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 03 July 2008-17 July 2008; individualCount: 2; recordedBy: E. Heußler; disposition: SMNG

g. country: Germany; locality: Halle (Saale); verbatimLocality: Halle Botanical Garden; decimalLatitude: 51.4894; decimalLongitude: 11.9591; geodeticDatum: WGS84; eventDate: 09 May 2011; individualCount: 15; recordedBy: H. Reip; disposition: SMNG

h. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84; eventDate: 10 November 2007; individualCount: 11; recordedBy: H. Reip; disposition: SMNG

i. country: Germany; locality: Jena; verbatimLocality: Jena Botanical Garden; decimalLatitude: 50.9308; decimalLongitude: 11.5858; geodeticDatum: WGS84; eventDate: 15 March 2004, 11 April 2008; individualCount: 6; recordedBy: H. Reip; disposition: SMNG

j. country: Germany; locality: Karlsruhe; verbatimLocality: Karlsruhe Botanical Garden; decimalLatitude: 49.0136; decimalLongitude: 8.4011; geodeticDatum: WGS84; eventDate: 13 April 2010; individualCount: 11; recordedBy: H. Reip; disposition: SMNG

k. country: Germany; locality: Kiel; verbatimLocality: Kiel Botanical Garden; decimalLatitude: 54.3470; decimalLongitude: 10.1158; geodeticDatum: WGS84; eventDate: 07 November 1998–11 September 1999; recordedBy: Wilck, Adis & Golovatch; source: Wilck 2000

l. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 14 August 2007; individualCount: 4; recordedBy: P. Decker & N. Laufer; disposition: SMNG; source: Decker & Hannig 2011

m. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 30 June 2010; individualCount: 10; recordedBy: H. Reip; disposition: SMNG

n. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: 31 December 1995, 03 April 2013; individualCount: 23; recordedBy: E. N. Lindner; disposition: SMNG

o. country: Germany; locality: Magdeburg; verbatimLocality: Gruson-Greenhouses; decimalLatitude: 52.1139; decimalLongitude: 11.6315; geodeticDatum: WGS84; eventDate: 13 June 2012; individualCount: 29; recordedBy: H. Reip; disposition: SMNG

p. country: Germany; locality: Mainz; verbatimLocality: Mainz Botanical Garden; decimalLatitude: 49.9925; decimalLongitude: 8.2454; geodeticDatum: WGS84; eventDate: 04 November 2006; individualCount: 8; recordedBy: P. Decker; disposition: SMNG

q. country: Germany; locality: München [Munich]; verbatimLocality: München-Nymphenburg Botanical Garden; decimalLatitude: 48.1606; decimalLongitude: 11.5021; geodeticDatum: WGS84; eventDate: 28 May 2009; individualCount: 6; recordedBy: H. Reip; disposition: SMNG

r. country: Germany; locality: Potsdam; verbatimLocality: Biosphere Potsdam; decimalLatitude: 52.4185; decimalLongitude: 13.0486; geodeticDatum: WGS84; eventDate: 19 September 2013; individualCount: 5; recordedBy: E. N. Lindner; disposition: SMNG

s. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 33; recordedBy: H. Reip; disposition: SMNG

Distribution: South America

Family Paradoxosomatidae Daday, 1889

Oxidus gracilis (C. L. Koch, 1847)

Materials

a. country: Germany; locality: Bayreuth; verbatimLocality: Bayreuth Ecological Botanical Garden; decimalLatitude: 50.9810; decimalLongitude: 13.5730; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 500; eventDate: 23 January 2012; individualCount: 1; recordedBy: A. Berthold

b. country: Germany; locality: Bayreuth; verbatimLocality: Bayreuth Ecological Botanical Garden; decimalLatitude: 50.9810; decimalLongitude: 13.5730; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 500; eventDate: 16 February 2012; individualCount: 1; recordedBy: H. Hennig; disposition: SMNG

c. country: Germany; locality: Berlin; verbatimLocality: Berlin Zoological Garden; decimalLatitude: 52.5102; decimalLongitude: 13.3366; geodeticDatum: WGS84; eventDate: 28 September 2013; individualCount: 7; recordedBy: P. Decker & M. Köhler; disposition: SMNG

d. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 29 April 2005; individualCount: 5; recordedBy: H. Reip; disposition: SMNG

e. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 1927-1928; recordedBy: Boettger; source: Boettger 1929

f. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; disposition: ZMB; source: Schubart 1929a, Schubart 1934

g. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Dahl; source: Verhoeff 1907

h. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Eichler; source: Eichler 1952

i. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 28; recordedBy: E. N. Lindner; disposition: SMNG

j. country: Germany; locality: Berlin; verbatimLocality: cemetary nursery in Eythstraße; decimalLatitude: 52.4590; decimalLongitude: 13.3640; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 250; source: Schubart 1957

k. country: Germany; locality: Berlin; verbatimLocality: horticulture company Bermann Rothe (Beyroth) in Berlin-Zehlendorf; decimalLatitude: 52.4320; decimalLongitude: 13.2580; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 3000; recordedBy: Boettger; source: Boettger 1929

l. country: Germany; locality: Berlin; verbatimLocality: nursery; decimalLatitude: 52.5200; decimalLongitude: 13.3900; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 20000; source: Schubart 1929a

m. country: Germany; locality: Bochum; verbatimLocality: Bochum Botanical Garden; decimalLatitude: 51.4433; decimalLongitude: 7.2669; geodeticDatum: WGS84; eventDate: November 2005; recordedBy: C. Schmidt

n. country: Germany; locality: Bonn; verbatimLocality: Bonn Botanical Garden; decimalLatitude: 50.7243; decimalLongitude: 7.0913; geodeticDatum: WGS84; eventDate: 14 August 2007; individualCount: 5; recordedBy: P. Decker & N. Laufer; disposition: SMNG

o. country: Germany; locality: Bonn; verbatimLocality: hothouse of Mr. Biesing; decimalLatitude: 50.7315; decimalLongitude: 7.0977; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 3240; eventDate: 08 August 1890; recordedBy: K. W. Verhoeff; disposition: ZMB; source: Verhoeff 1891

p. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 07 January 2012; individualCount: 12; recordedBy: P. Decker & S. Worch; disposition: SMNG

q. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 13 November 1964, 17 November 1964, 21 November 1964; individualCount: 35; recordedBy: H. Richter; disposition: SMNG; source: Richter 1967

r. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 10 March 2013; individualCount: 8; recordedBy: E. N. Lindner; disposition: SMNG

s. country: Germany; locality: Duisburg; verbatimLocality: greenhouse; decimalLatitude: 51.4300; decimalLongitude: 6.7600; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 10000; eventDate: 20 November 1987; individualCount: 1; recordedBy: Beckers

t. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 06 June 2008-17 July 2008; individualCount: 34; recordedBy: E. Heußler; disposition: SMNG

u. country: Germany; locality: Frankfurt am Main; verbatimLocality: Palm Garden; decimalLatitude: 50.1233; decimalLongitude: 8.6559; geodeticDatum: WGS84; eventDate: 08 November 2008, 28 November 2011; individualCount: 8; recordedBy: H. Reip; disposition: SMNG

v. country: Germany; locality: Gießen; verbatimLocality: Gießen Botanical Garden; decimalLatitude: 50.5864; decimalLongitude: 8.6789; geodeticDatum: WGS84; eventDate: 1973-1974; individualCount: 9; source: Läffert 1984

w. country: Germany; locality: Halle (Saale); verbatimLocality: Halle Botanical Garden; decimalLatitude: 51.4894; decimalLongitude: 11.9591; geodeticDatum: WGS84; eventDate: 09 May 2011; individualCount: 14; recordedBy: H. Reip; disposition: SMNG

x. country: Germany; locality: Halle (Saale; verbatimLocality: hothouse; decimalLatitude: 51.4790; decimalLongitude: 11.9640; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 6000; source: Schubart 1934

y. country: Germany; locality: Hamburg; verbatimLocality: hothouses of the nursery Richers; decimalLatitude: 53.5500; decimalLongitude: 9.9900; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 10000; individualCount: 1; source: Latzel 1895

z. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84; eventDate: 10 November 2007; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

aa. country: Germany; locality: Hannover; verbatimLocality: hothouse; decimalLatitude: 52.3700; decimalLongitude: 9.7400; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 10000; source: Schubart 1934

ab. country: Germany; locality: Jena; verbatimLocality: Jena Botanical Garden; decimalLatitude: 50.9308; decimalLongitude: 11.5858; geodeticDatum: WGS84; eventDate: 15 March 2004, 19 March 2004, 11 April 2008; individualCount: 15; recordedBy: H. Reip; disposition: SMNG

ac. country: Germany; locality: Karlsruhe; verbatimLocality: Karlsruhe Botanical Garden; decimalLatitude: 49.0136; decimalLongitude: 8.4011; geodeticDatum: WGS84; eventDate: 13 April 2010; individualCount: 12; recordedBy: H. Reip; disposition: SMNG

ad. country: Germany; locality: Kiel; verbatimLocality: Kiel Botanical Garden; decimalLatitude: 54.3470; decimalLongitude: 10.1158; geodeticDatum: WGS84; eventDate: 07 November 1998–11 September 1999; recordedBy: Wilck, Adis & Golovatch; source: Wilck 2000

ae. country: Germany; locality: Köln [Cologne]; verbatimLocality: Cologne Botanical Garden; decimalLatitude: 50.9607; decimalLongitude: 6.9692; geodeticDatum: WGS84; eventDate: 30 June 2010; individualCount: 8; recordedBy: H. Reip; disposition: SMNG

af. country: Germany; locality: Konstanz; verbatimLocality: Mainau, butterfly house; decimalLatitude: 47.7068; decimalLongitude: 9.1951; geodeticDatum: WGS84; eventDate: 21 April 2012; individualCount: 1; recordedBy: N. Lindner; disposition: SMNG

ag. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: 30 November 1995; recordedBy: E. N. Lindner; disposition: SMNG

ah. country: Germany; locality: Leipzig; verbatimLocality: nursery garden and horticulture Felgenträger; decimalLatitude: 51.3690; decimalLongitude: 12.4400; geodeticDatum: WGS84; eventDate: 09 November 2008; individualCount: 6; recordedBy: N. Lindner; disposition: SMNG

ai. country: Germany; locality: Leipzig; verbatimLocality: Zoological Garden Leipzig, Gondwanaland; decimalLatitude: 51.3505; decimalLongitude: 12.3716; geodeticDatum: WGS84; eventDate: 26 March 2013, 05 April 2013; individualCount: 5; recordedBy: E. N. Lindner; disposition: SMNG

aj. country: Germany; locality: Magdeburg; verbatimLocality: Gruson-Greenhouses; decimalLatitude: 52.1139; decimalLongitude: 11.6315; geodeticDatum: WGS84; eventDate: 13 June 2012; individualCount: 23; recordedBy: H. Reip; disposition: SMNG

ak. country: Germany; locality: Mainz; verbatimLocality: Mainz Botanical Garden; decimalLatitude: 49.9925; decimalLongitude: 8.2454; geodeticDatum: WGS84; eventDate: 04 November 2006; individualCount: 28; recordedBy: P. Decker; disposition: SMNG

al. country: Germany; locality: Mainz; verbatimLocality: Palm house at city park; decimalLatitude: 49.9897; decimalLongitude: 8.2893; geodeticDatum: WGS84; eventDate: 1998-2009; recordedBy: P. Decker; disposition: SMNG

am. country: Germany; locality: Marburg; verbatimLocality: Marburg Botanical Garden; decimalLatitude: 50.8024; decimalLongitude: 8.8078; geodeticDatum: WGS84; eventDate: 15 February 2012; individualCount: 34; recordedBy: M. Reich & S. Schaub-Grüssing; disposition: SMNG

an. country: Germany; locality: Marlow; verbatimLocality: Ornithological Park Marlow; decimalLatitude: 54.1449; decimalLongitude: 12.5692; geodeticDatum: WGS84; eventDate: 31 July 2006; individualCount: 3; recordedBy: H. Reip; disposition: SMNG

ao. country: Germany; locality: München [Munich]; verbatimLocality: München-Nymphenburg Botanical Garden; decimalLatitude: 48.1606; decimalLongitude: 11.5021; geodeticDatum: WGS84; source: Boettger 1929

ap. country: Germany; locality: Potsdam; verbatimLocality: Biosphere Potsdam; decimalLatitude: 52.4185; decimalLongitude: 13.0486; geodeticDatum: WGS84; eventDate: 20 June 1905; recordedBy: H. Hauser; disposition: SMNG

aq. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 25; recordedBy: H. Reip; disposition: SMNG

ar. country: Germany; locality: Potsdam; verbatimLocality: horticulture company Bermann Rothe (Beyroth) in Potsdam-Neubabelsberg; decimalLatitude: 52.3990; decimalLongitude: 13.1040; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 3000; source: Schubart 1957

as. country: Germany; locality: Tharandt; verbatimLocality: Tharandt Forest Botanical Garden; decimalLatitude: 50.9810; decimalLongitude: 13.5730; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 500; eventDate: 23 July 1966; individualCount: 2; recordedBy: H. Richter; disposition: SMNG

at. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: 18 March 2013; individualCount: 1; recordedBy: D. Matzke

au. country: Germany; locality: Oldenburg; verbatimLocality: Oldenburg Botanical Garden; decimalLatitude: 53.1486; decimalLongitude: 8.1942; geodeticDatum: WGS84; eventDate: 29 November 2013; individualCount: 11; recordedBy: H. Reip; disposition: SMNG

Distribution: East Asia

Strongylosoma stigmatosum (Eichwald, 1830)

Material

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; source: Eichler 1952

Distribution: Europe

Family Polydesmidae Leach, 1815

Brachydesmus superus Latzel, 1884

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 19 March 2004; individualCount: 1; recordedBy: H. Reip; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; recordedBy: Eichler; disposition: ZMB; source: Schubart 1929a, Eichler 1952

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; source: Eichler 1952

Distribution: Europe

Polydesmus angustus Latzel, 1884

Material

a. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 07 January 2012; individualCount: 1; recordedBy: P. Decker & S. Worch; disposition: SMNG

Distribution: Europe

Polydesmus complanatus (Linnaeus, 1761)

Materials

a. country: Germany; locality: Hamburg; verbatimLocality: Hamburg-Wandsbeck; decimalLatitude: 53.5830; decimalLongitude: 10.0850; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 1000; source: Hahmann 1929a,Hahmann 1929b

b. country: Germany; locality: Berlin; verbatimLocality: Berlin Old Botanical Garden; decimalLatitude: 52.4565; decimalLongitude: 13.3074; geodeticDatum: WGS84; source: Eichler 1952

Distribution: Europe

Polydesmus inconstans Latzel, 1884

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; source: Eichler 1952

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 15 May 2013; individualCount: 5; recordedBy: E. N. Lindner; disposition: SMNG

Distribution: Europe

Family Pyrgodesmidae Silvestri, 1896

Poratia digitata (Porat, 1889)

Materials

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; eventDate: 29 April 2005; individualCount: 2; recordedBy: H. Reip; disposition: SMNG

b. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; source: Eichler 1952

c. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; individualCount: 1; disposition: ZMB; source: Schubart 1929a

d. country: Germany; locality: Dresden; verbatimLocality: Dresden Botanical Garden; decimalLatitude: 51.0435; decimalLongitude: 13.7582; geodeticDatum: WGS84; eventDate: 17 November 1964; source: Richter 1967

e. country: Germany; locality: Düsseldorf; verbatimLocality: Aquazoo-Löbbecke Museum; decimalLatitude: 51.2564; decimalLongitude: 6.7497; geodeticDatum: WGS84; source: Adis et al. 2000

f. country: Germany; locality: Hamburg; verbatimLocality: Hamburg Botanical Garden; decimalLatitude: 53.5603; decimalLongitude: 9.9858; geodeticDatum: WGS84; eventDate: 10 November 2007; individualCount: 7; recordedBy: H. Reip; disposition: SMNG

g. country: Germany; locality: Hamburg; verbatimLocality: tannery; decimalLatitude: 53.4870; decimalLongitude: 10.2150; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 4000; individualCount: 3; source: Latzel 1895

h. country: Germany; locality: Karlsruhe; verbatimLocality: Karlsruhe Botanical Garden; decimalLatitude: 49.0136; decimalLongitude: 8.4011; geodeticDatum: WGS84; eventDate: 13 April 2010; individualCount: 7; recordedBy: H. Reip; disposition: SMNG

i. country: Germany; locality: Kiel; verbatimLocality: Kiel Botanical Garden; decimalLatitude: 54.3470; decimalLongitude: 10.1158; geodeticDatum: WGS84; eventDate: 07 November

1998–11 September 1999; individualCount: 2; recordedBy: Wilck, Adis & Golovatch; source: Wilck 2000, Adis et al. 2000

j. country: Germany; locality: Leipzig; verbatimLocality: Leipzig Botanical Garden; decimalLatitude: 51.3283; decimalLongitude: 12.3912; geodeticDatum: WGS84; eventDate: 08 December 1995, 31 December 1995; individualCount: 12; recordedBy: E. N. Lindner; disposition: SMNG

k. country: Germany; locality: Leipzig; verbatimLocality: Zoological Garden Leipzig, Gondwanaland; decimalLatitude: 51.3505; decimalLongitude: 12.3716; geodeticDatum: WGS84; eventDate: 26 March 2013, 05 April 2013; individualCount: 6; recordedBy: E. N. Lindner; disposition: SMNG

l. country: Germany; locality: Potsdam; verbatimLocality: Potsdam Botanical Garden; decimalLatitude: 52.4040; decimalLongitude: 13.0250; geodeticDatum: WGS84; eventDate: 07 November 2009; individualCount: 53; recordedBy: H. Reip; disposition: SMNG

m. country: Germany; locality: Oldenburg; verbatimLocality: Oldenburg Botanical Garden; decimalLatitude: 53.1486; decimalLongitude: 8.1942; geodeticDatum: WGS84; eventDate: 29 November 2013; individualCount: 27; recordedBy: H. Reip; disposition: SMNG

Distribution: South America

Poratia obliterata (Kraus, 1960)

Material

a. country: Germany; locality: Kiel; verbatimLocality: Kiel Botanical Garden; decimalLatitude: 54.3470; decimalLongitude: 10.1158; geodeticDatum: WGS84; eventDate: 07 November 1998–11 September 1999; individualCount: 20; recordedBy: Wilck, Adis & Golovatch; source: Wilck 2000, Adis et al. 2000

Distribution: South America

Order Chordeumatida Pocock 1894

Family Chordeumatidae C. L. Koch, 1847

Melogona voigtii (Verhoeff, 1899)

Material

a. country: Germany; locality: Berlin; verbatimLocality: Berlin-Dahlem Botanical Garden; decimalLatitude: 52.4548; decimalLongitude: 13.3085; geodeticDatum: WGS84; source: Eichler 1952

Distribution: Europe

Discussion

The present study is the second comprehensive survey of German greenhouse myriapods since Eichler (1952) and is derived from both the existing literature and our own extensive sampling.Eichler (1952) We collected more than 1800 specimens belonging to 41 species (29 Diplopoda, 12 Chilopoda), which makes a total of 53 species (35 Diplopoda and 18 Chilopoda) (Suppl. material 2).

Six centipedes and 12 millipedes are herewith recorded for the first time from German greenhouses: *Cryptops doriae*, *Henia vesuviana*, *Lamyctes coeculus*, *Lithobius mutabilis*, *Pachymerium ferrugineum*, *Tygarrup javanicus*, *Anadenobolus monilicornis* (Fig. 3), *Archiboreoiulus pallidus*, *Boreoiulus tenuis*, *Brachyiulus pusillus*, *Cylindroiulus vulnerarius*, Epinannolene cf. trinidadensis, *Epinannolene* spec., *Leptogonoiulus sorornus*, *Mesoiulus gridellii*, *Polydesmus angustus*, *Prosopodesmus jacobsoni* and *Rhinotus purpureus*.

Figure 3.

The colourful Caribbean species *Anadenobolus monilicornis* was only recorded in Gondwanaland, Zoological Garden Leipzig.

Leptogonoiulus sorornus (Fig. 4) and the two species of genus *Epinannolene* are recorded for the first time in Europe. While the first species of *Epinannolene* fits quite well the original description of *E. trinidanensis* by Chamberlin (1918), the second one is probably an undescribed species, closely related to *Epinannolene alticola* (Silvestri, 1898) and *E. exilio* (Brölemann, 1904).

Figure 4.

The tropical tramp species *Leptogoniulus sorornus* is here recorded for the first time in Europe from the Zoological Garden Leipzig and the Zoological Garden Berlin.

A total of 34% (i.e. 18 species) are species introduced from other continents (Suppl. material 2): 15 % of those recorded have their origin in Southern and Central America, 13% in Asia, 4 % in Australia, and only 2 % in Africa.

The total number of non-European species introduced to Germany is higher and includes, for instance, Chondrodesmus cf. riparius Carl, 1914 in houseplants (Decker and Hannig 2011) and other occasionally introduced species (Attems 1901, Dunger 1965, Jeekel 1964b, Kraepelin 1901, Schubart 1934 pp. 304-306). Stoev et al. (2010) list for Europe 20 alien species of millipedes and 16 of centipedes.

Most of the alien species in German greenhouses are also known from other such places in Europe. There are a few species recorded from other European greenhouses which we have not found in Germany yet. These could also be expected to possibly be introduced to or occur in German greenhouses – species such as *Mecistocephalus guildingii* (Barber 2009), *Prosopodesmus panporus* Blower & Rundle, 1980 (Blower and Rundle 1980), and *Haplopodoiulus spathifer* (Brölemann, 1897) (Read 2008) recorded in Great Britain, *Tuoba poseidonis* (Verhoeff, 1901) recorded in Finland (Andersson et al. 2005) and *Aulonopygus aculeatus* Attems, 1914 recorded from the Netherlands (Soesbergen and Jeekel 2007).

Sixty-six per cent of all recorded species (35 in total) are of European origin. Two examples of the successful establishment of indigenous species in greenhouses are *Lithobius forficatus* and *Blaniulus guttulatus*. *L. forficatus*, followed by *Cryptops hortensis*, is the most frequently found centipede in German greenhouses. The former normally inhabits natural habitats and areas of human settlement and is frequently found in houses and cellars. Likewise, among indigenous millipedes *B. guttulatus* is the most commonly found. In Germany it prefers synanthropic habitats and occurs on arable and waste land, while,

especially in the west and southwest of Germany, it is also known from human settlements (Schubart 1934).

About 25% of the recorded species are found exclusively in greenhouses, especially in heated ones, and are thus unlikely to establish outside. These are: *Cryptops doriae*, *Lamyctes coeculus*, *Tygarrup javanicus*, *Amphitomeus attemsi*, *Anadenobolus monilicornis* , *Cylindrodesmus hirsutus*, *Epinannolene* species, *Leptogoniulus sorornus*, *Mesoiulus gridellii*, *Paraspirobolus lucifugus*, *Poratia* species, *Prosopodesmus jacobsoni*, and *Rhinotus purpureus*.

The parthenogenetic species *Amphitomeus attemsi* (Fig. 5), *Cylindrodesmus hirsutus* and *Poratia digitata* are very frequent (with *A. attemsi* being the second most common millipede species) and were found in many of the greenhouses investigated.

Figure 5.

The tiny (2.9-3.2 mm) parthenogenetic *Amphitomeus attemsi* is a common species in greenhouses.

The East Asian species *Oxidus gracilis*, which is the most frequent millipede in greenhouses, was observed outdoors in two sites in Mainz, Rhineland-Palatinate (2003-2009, pers. obs. Decker) during winter, albeit only in very large compost heaps or large accumulations of rotting material with evenly warm-humid conditions. In other European countries *O. gracilis* is also common in greenhouses, city parks and gardens (Stoev and Korsós 2010). Other species, like the North African *C. truncorum* and the European species *B. tenuis*, *C. palmatus* and *N. kochii*, are restricted to anthropogenic, synanthropic habitats and greenhouses. *C. vulnerarius* is hitherto known only from a garden in Waltrop, North Rhine-Westphalia (Decker and Hannig 2011) suggesting that this species can also survive in urban habitats. Although currently there are no outdoor records of *M. gridellii* known from Germany, this species, originally reported from Italy, is known from several urban sites in adjacent Austria (Gruber 2002) and could also inhabit similar biotopes (e.g. gardens, parks or subterranean passageways) in Germany.

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Supplementary materials

Suppl. material 1: Occurrence data of Diplopoda and Chilopoda from German greenhouses

Authors: Peter Decker & Hans Reip
Data type: Microsoft Excel spreadsheet
Brief description:
Occurrence data of Diplopoda and Chilopoda from German greenhouses, including the name of the federal state, city, location, site, coordinates, micro-habitat, sampling date, collector, sampled specimens, collection, notes and literature.
Filename: full_records.xls - Download file (163.00 kb)

Suppl. material 2: Distribution of German greenhouse myriapods across cities

Authors: Peter Decker, Hans Reip & Karin Voigtländer
Data type: Microsoft Excel spreadsheet
Brief description:
The dataset provides a complete list of greenhouse myriapods and their distribution across the cities.
Filename: overview_species_city.xls - Download file (42.50 kb)